SATELLITE DEALER NEWSLETTER

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Tracking Down the Right TVRO System for Your Customers

The satellite signals transmitted by our North American domsats are microwaves that exhibit many of the characteristics of light. Like visible light, they travel in a straight path from the satellites to the earth below. Since satellites transmit low levels of microwave power (usually between 5 and 8.5 watts per transponder), the on-board satellite antennas are designed to concentrate these microwaves onto the desired coverage area, thereby making the most effective use of the available signal. The unique pattern of "illumination" created by each satellite is called a "footprint."

Our American domsats have their antennas directed on the middle of the United States. At "beam center," the satellite signals are the strongest. As the distance from beam center increases, the signal levels will gradually drop to lower levels of intensity.

Before any American satellite is launched, the operating company must submit a proposal to the FCC. Each proposal must include a footprint map that illustrates the satellite's coverage pattern. Every footprint map has a series of contour lines that delineate the points at which the signal levels decrease from beam-center values. These contour lines are carried out to "beam-edge"—the limits of effective visibility for the particular satellite in question.

The satellite footprint maps provided to the FCC are derived from computer ized studies of satellite antenna performance tests that are conducted at ground level. While these maps do provide a good representation of the manufacturer's intentions, the real-world performance of the birds does not always measure up to the theoretical model.

International satellite entrepreneurs such as Bob Behar, for example, have discovered satellite signals several hundred miles farther into South America than what was indicated by the FCC coverage maps. Still, these footprint patterns generally give earth station system designers a good idea of what can be expected from a given satellite. To obtain more exacting information would require technically accurate data from hundreds or even thousands of earth stations scattered throughout the coverage area. Until these surveys are conducted, computer-derived footprint maps offer the best satellite performance data available.

Knowledge of a satellite's signal strength at a given location is essential for the planning of any earth station installation. Private and commercial earth station designers use the footprints to determine the most effective combination of LNAs, dishes and receivers for reception of a given satellite. While the gain of the earth station antenna, the noise temperature of the LNA and the carrier-to-noise (C/NR) threshold of the TVRO receiver can be determined from the equipment literature, the intensity of a satellite transmission at a specific location is most easily ascertained from the available footprint maps.

Satellite signal levels are defined in terms of EIRP, or effective isotropic radiated power. The beam-center EIRP for a given satellite is obtained by combining the gain of the on-board satellite antenna and the power level of the transmitting traveling wave tube amplifier, or TWTA.

The gain of each satellite's on-board antenna is expressed in decibels, or dBs. (A decibel is a comparative measurement of the ratio of one power to another.) Dish gain measurements are made in reference to a standard isotropic antenna, which is an imaginary antenna conceived by engineers. The isotropic antenna theoretically transmits signals

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Minneapolis Survival Guide

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Can/Am Exhibition Hours

June 24–26

Friday: Noon-7 p.m.
Saturday: 11 a.m.-7 p.m.
Sunday: 9 a.m.-2:30 p.m.

Conference Schedule

Friday: 9:30 a.m.-5 p.m.
Saturday: 10 a.m.-5 p.m.
Sunday: 9 a.m.-2 p.m.

All conferences will be held in the Garden Court, located on the east side of the first floor near the indoor pool, and in Atrium Room No. 3, located on the second floor of the executive tower on the north side of the building. Conferences will break for lunch from noon until 1 p.m. Any changes in conference times or locations will be announced at the show.

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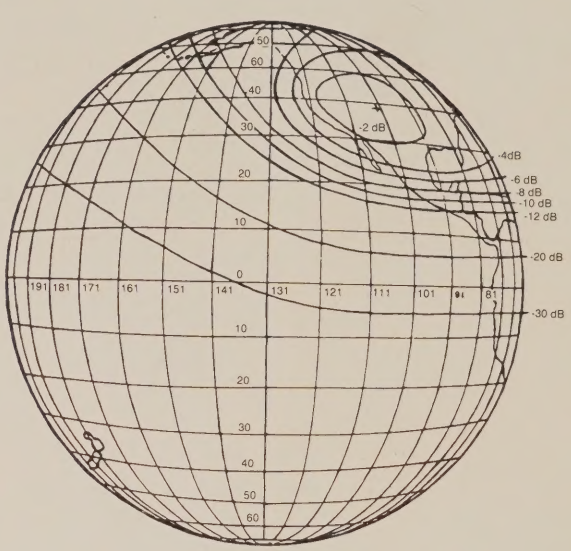

Fig. 1 Westar 5 vertical transmitting antenna gain (4.1 GHz) for 123 degrees

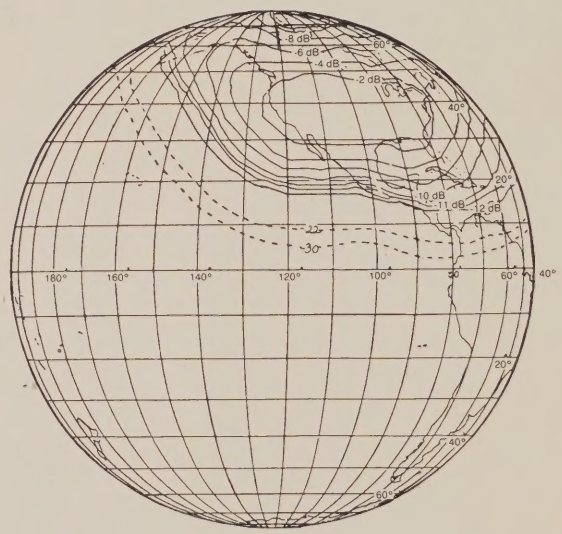

Fig. 2. Satcom F3 transmitting antenna gain (4 GHz) for 131 degrees west

equally in all directions at once. It has a gain of 0 dB. Since the real-life satellite antenna is shaped to concentrate the transmitted signal within a narrow corridor out in front of it called the boresight, it can provide a much higher signal level in the desired direction than if the signal were allowed to be dispersed in all directions. The gain provided by Westar 5's antenna at boresight, for example, is 31 dBi (decibels referenced to an isotropic antenna), providing a signal level that is more than 1,000 times greater than what the theoretical isotropic antenna could produce.

EIRP is expressed in dBWs, or decibels over 1 watt of power. To determine the EIRP level at beam center of Westar 5, the 31-dBi gain figure for the onboard dish antenna must be added to the power level of the bird's TWTAs. Westar 5 has 8-watt TWTAs. Before these two figures can be added together, the 8-watt value must be converted to dBWs, or decibels above 1 watt of power. This is accomplished by using the following formula: in dBW = 10 LOG P1/P2, where P1 is 8 watts and P2 is the 1 watt reference; 8 watts = 9 dBW. For Westar 5, the EIRP at beam center is 31 dBi + 9 dBW or 40 dBW. By subtracting the values given at each of Westar 5's contour lines, we can obtain the correct EIRP level at any location. For locations that are in the middle between two contour lines, one would split the difference between the two contour levels. (Fig. 1).

Only the vertically polarized transponder set on Westar 5 is referenced to the 40 dBW beam-center EIRP. The 12 horizontally polarized transponders have a portion of their signals split off and fed to a separate spot beam centered on Hawaii, providing a more efficient transmitting technique than the dispersion of the main footprint pattern over the thousands of square miles of uninhabited ocean that lie between the mainland and the islands. But the use of the Hawaiian spot beam does reduce by 1 to 2 dBW the North American footprint contour levels for the horizontally polarized transponders. Consequently, the odd-numbered transponders have an EIRP of only 38 dBW on boresight.

Satcom F3 has three sets of transponders with different EIRP levels.

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Amplica is introducing the first Home Satellite System designed from the ground up.
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INTRODUCING THE AMPLICA HOME SATELLITE SYSTEM I

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Transponders 3, 7, 11, 15, 19 and 23 all connect to 8.5-watt TWTAs for a beam-center EIRP of 39.8 dBW. Transponders 4, 8, 12, 16, 20 and 24 connect to 5-watt TWTAs for a boresight EIRP of 37.6 dBW. Like Westar 5, the remaining 5-watt transponders on Satcom F3 have a portion of their transmitter power siphoned off to a spot beam of Hawaii, which reduces their EIRP levels to a beam center value of 35.6 dBW (Fig. 2).

In many respects, Satcom F4 is identical in design to Satcom F3. But unlike her sister spacecraft, Satcom F4 has no Hawaiian spot beam. Satcom F4's location at the eastern end of North America's section of the Clarke Belt precludes reception in Hawaii. Satcom F4 has the same set of 8.5-watt transponders with a beam-center EIRP of 39.8 dBW. The remaining 18 transponders that feed 5-watt TWTAs have an EIRP of 37.6 dBW on boresight (Fig. 3).

Also included is a footprint map for SpaceNet I, which should become operational in 1984. SpaceNet has 8.5-watt solid-state power amplifiers, or SSPAs. With an antenna gain of 31 dBi, SpaceNet I has a beam-center EIRP of 40.2 dBW (see Fig. 4 on page 28).

The following table allows you to select the correct combination of

(Continued on page 28)

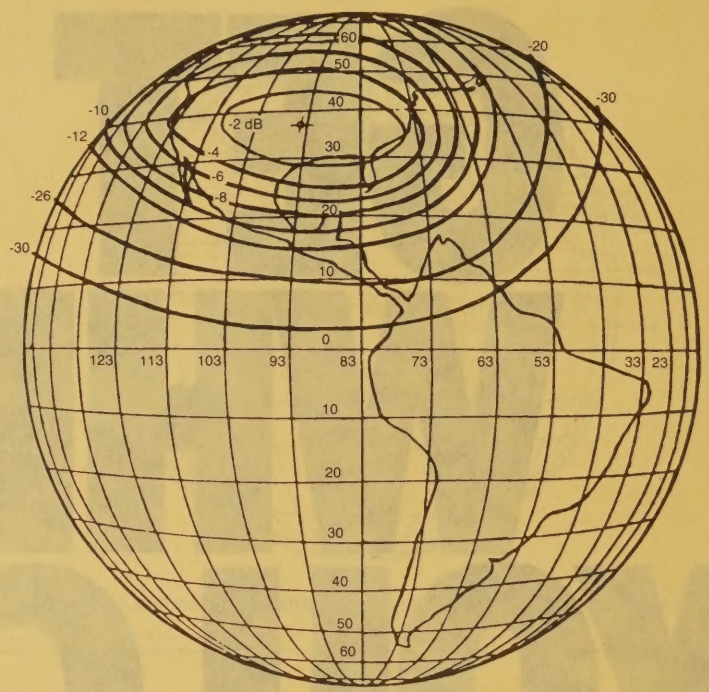

Fig. 3 Satcom F4 transmitting antenna gain (4 GHz) for 83 degrees west

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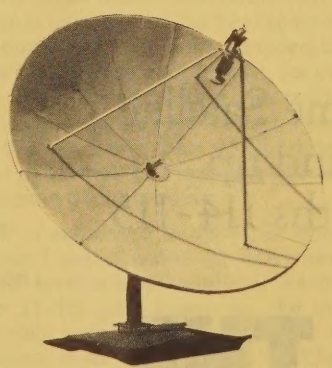

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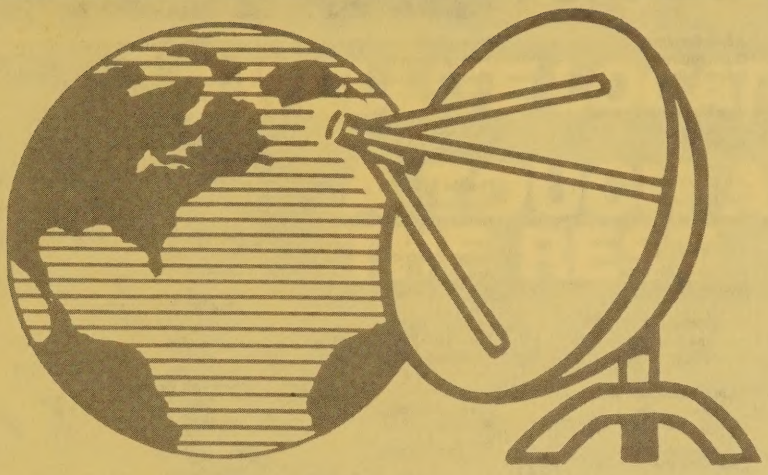

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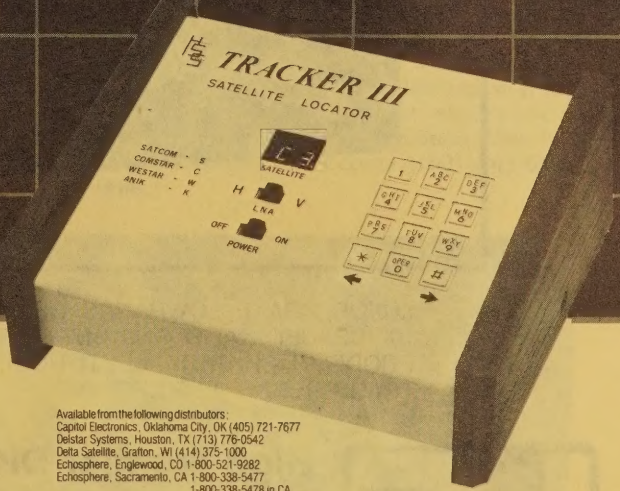

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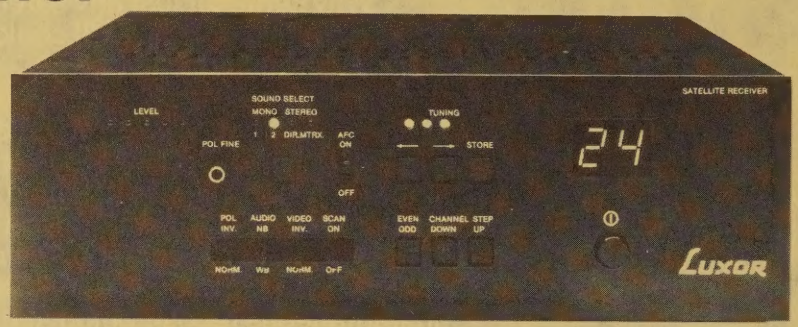

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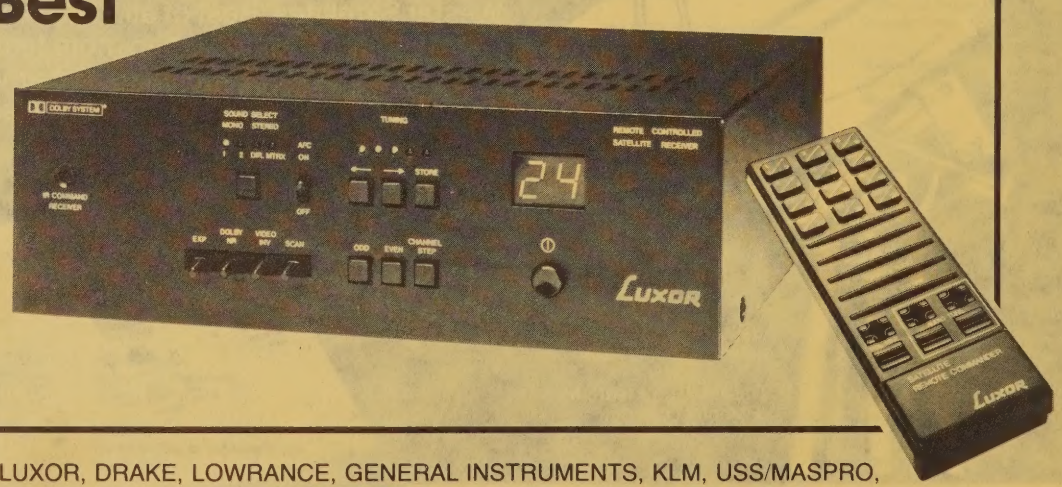

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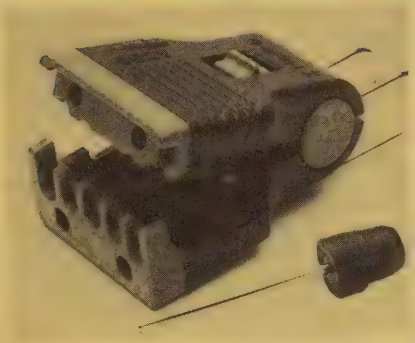
PRODUCT NEWS



Natropolis Industries

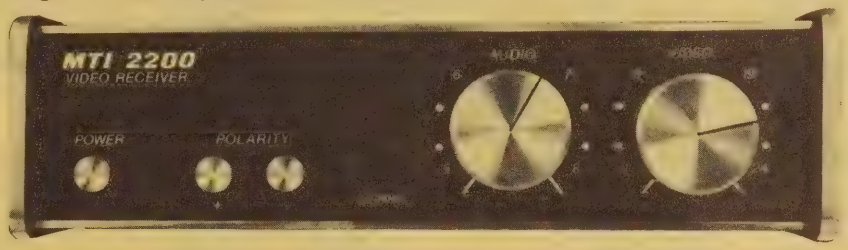
Natropolis' correction finder focusing tool sets up every dish right, is portable, light, extends to 60 inches and can be used with the Chaparral Polarotor and feedhorns of almost any kind. Natropolis' coax Kwik Strip provides an economical way to strip RG-58/U and RG-59/U cables. It has a spare blade and a hand-carrying clip for belts, along with complete instructions. For more information, contact: Natropolis Industries, 5360 S. Cameron, No. 6, Las Vegas, NV 89118, (702) 871-3636.

Laux Communications

Laux Communications continues its expansion into the TVRO field with the MRC series of automatic antenna positioners. The MRC series positioners all feature 90-volt DC Saginaw Steering Gear actuators and are completely self-contained. The MRC1000 is an up/down positioner. The MRC2000 features a large, bright, LED position display. The MRC4000 is a top-of-the-line, 64-position, fully programable unit with the exclusive "crawl" feature, eliminating irritating antenna overshoot. All the MRC series positioners are attractively packaged and reasonably priced. The units are sturdy, easy to install and operate and feature a 12-month limited warranty. Best of all, they work every time, easily and efficiently.

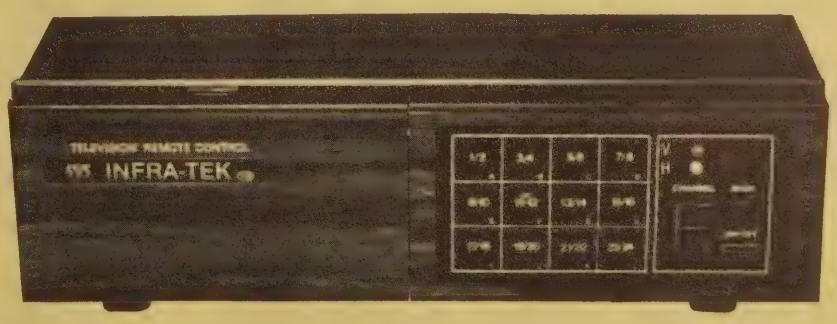
MTI Systems

The new "Total Concept" receiver mates perfectly with MTI's 2100 antenna positioner and has the basic features most desirable to the home user at a compact price. The features include: compact size and built-in Panasonic modulator for direct connection to TV, VTRs or monitor. The receiver is also designed to be compatible with Dexel's LNC or MTI's downconverters and has fully tunable audio with AFC, wide and narrow band switch for tuning of all subcarriers, AFC defeat switch, video invert switch and more. Visit MTI at Booths 223 and 224 or contact MTI Systems, MicroTenna, Inc., 2351 South 2300 West, Salt Lake City, UT 84119, (801) 972-4819.



Satellite Video Systems

Satellite Video Systems (SVS) manufactures the Infra-Tek 1800 wireless infrared satellite receiver, which eliminates all channel drift. You can literally place the downconverter from the freezer to the oven with no effect on the picture. This is an exceptional benefit for a wireless receiver. The new Infra-Tek 1800B opens up a whole new world for the home multi-receiver installation. The block downconverter can connect as many receivers in any installation as are called for, does away with the headaches of receivers "talking to each other" and the expense of ferrite isolators, power dividers, DC power blocks, etc. Even though SVS has the capabilities to produce 2,000 wireless receivers per month, with the current explosion in the satellite industry, new customers are warned to expect a 30- to 60-day back-order situation. Visit SVS at Booth 119 or contact (501) 843-6595.



High Frontier Distribution

High Frontier Distribution announces its appointment as regional distributor for the DX Marketing Group. The DX TVRO receiver line consists of a superb table-top chassis (DSA-642) or rack-mount chassis (DSA-643) block down-conversion receiver. The block down-conversion technique results in a sizable reduction of cost when used in multiple receiver installations. Another major advantage of this design is in tuning stability over temperature extremes. Visit High Frontier at Booths 301 and 302 or contact the company at 2230 East Indian School Road, Phoenix, AZ 85016, (800) 382-0395 or (206) 954-0395.

Automation Techniques

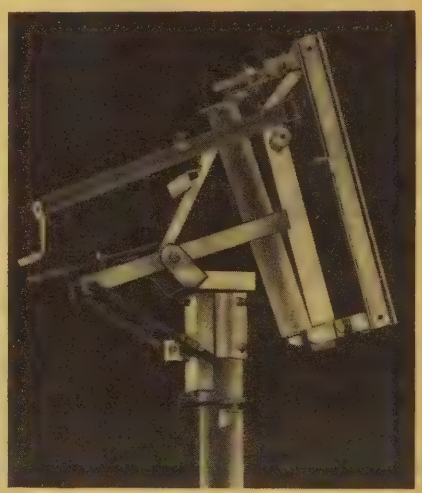
Automation Techniques has introduced a new low-cost satellite system for the home market called the GLS-800, which brings quality home TVROs within the price reach of the average customer. The package includes an ATI-produced and technically matched dish, low noise feed, satellite receiver and remote control, and is available through ATI's nationwide network of master distributors. For more information on the GLS-800 and other ATI products, call Frank Tackett, Marketing, at (918) 836-2584 or write to the company at 1550 N. 105th East Avenue, Tulsa, OK 74116.

Lowrance Electronics, Inc.

The System 7XL is the new Lowrance receiver with excellent performance and reliability. Features include detent tuning, signal strength meter, built-in modulator, 125 feet of cable, weather-proof downconverter, fixed and variable audio and more. The System 7AR combines all the above, plus stereo decoding and a remote control as standard equipment. Lowrance also gives you the selling tools to keep the market open, with dealer support that includes merchandising aids such as color posters, consumer TVRO question-and-answer brochures, product brochures and videotapes, all specifically designed to help you sell more earth stations. For further information, visit Booths 230 and 231 or contact (918) 437-6881.

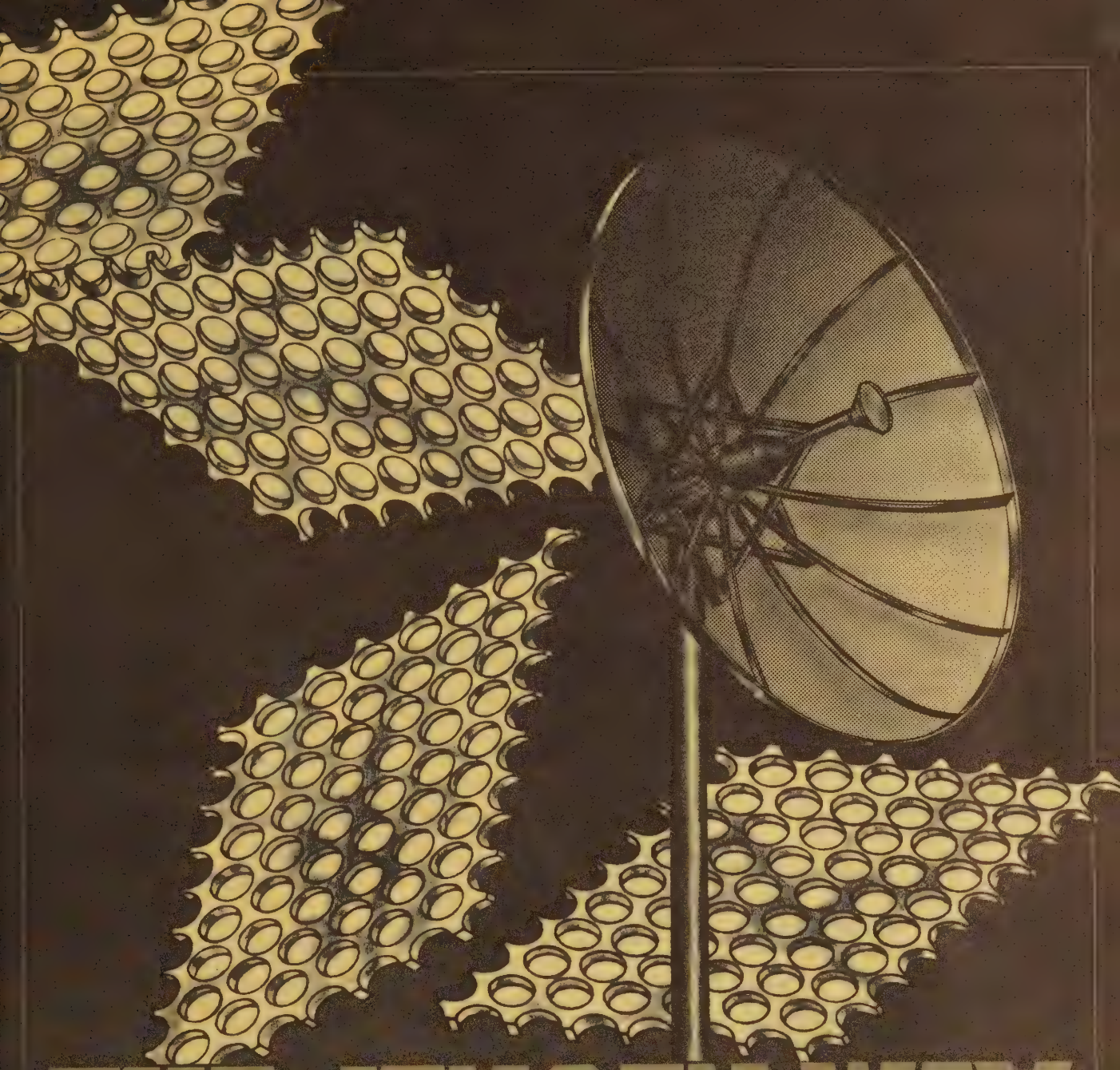
SatcoUSA

SatcoUSA features a one-piece fiberglass 8-foot, 6-inch square antenna. This high-performance dish has a 40-dB gain, superior to many 10-foot round antennas. It uses a solid metallic fabric—the same as MX missiles—for exceptional clarity. SatcoUSA antennas, combined with Automation Techniques receivers, enable dealers to sell one of the highest quality systems on the market at competitive pricing. SatcoUSA is setting up new dealers throughout the country. The Total Dealer Support Package includes: free training, ad slicks, technical information, profitable pricing, same-day shipping and exchange policy. Interested parties can visit SatcoUSA at Booths 256, 257 and 258 or can call (800) 362-8619, in Ohio (800) 362-6781.



South River Metal Products

Heavy-duty polar mounts are available from South River Metal Products. Designed to support antennas up to 13 feet in diameter, the mounts offer a high degree of strength, durability and tracking accuracy. Features include: single-axis tracking of full satellite arc, azimuth fine-tuning and a hot-dip galvanized finish. Available in pole or stand types, mounts are supplied with frames to interface with Prodelin, Harris, Vidare, Microdyne and Scientific-Atlanta antennas. An economy version is also available. For more information, contact: South River Metal Products, P.O. Box 394, Matawan, NY 07747, (201) 566-7087.



THE JENSEN WAY

When we designed the new Jensen System, we had one idea in mind. To make available an affordable high performance TVRO package — built on the longstanding tradition of Jensen quality. With no compromises.

Uncompromising quality. It's something you can always be sure of from Jensen. From the way we build our products, to the way we support our Distributors and Dealers.

Call us, we'll tell you all about our high efficiency complete systems featuring our durable, perforated, stamped metal dish. You see, before we made it beautiful, we made it right — after all, that's the Jensen way.

CALL TOLL FREE · 1-800-643-6586

Jensen

Amplica

Amplica announces the RC-20 Satellite Receiver System, the first LNC satellite receiver system to have infrared remote control, LED readout and detent tuning. Amplica joins its low noise amplifier with a custom downconverter to accomplish amplification, frequency conversion and channel selection in a single weatherproof package. Each RC-20 Satellite Receiver System is manufactured entirely by Amplica and includes receiver, low noise converter and cable assemblies to provide everything needed between antenna feed and TV set. In addition, the user gets the versatility afforded by Amplica's infrared remote control unit. See the new system at Booths 114 and 115 or contact (805) 498-9671.

Satellite Reception Systems, Inc.

Satellite Reception Systems, Inc., offers the largest display of on-line systems in the U.S.; low-cost, 24-to-36-hour, on-site regional delivery; shipping anywhere in the United States daily at 2 p.m. and 6 p.m.; mounts with five-year warranties; 30-day infant mortality on electronics; a large warehouse inventory with many items in stock; installation, technical assistance, troubleshooting; home and commercial systems; and SRS catalogs supplied free to active dealers. For additional information, visit Booth 101 or contact (800) 592-1956, in Ohio (800) 592-1957.

Newton Electronics

Newton Electronics' GBS2000 TVRO transponder simulator provides a tunable 3.7 to 4.2 GHz CW, fixed 70-MHz CW and audio subcarriers (with or without 1,000 Hz tone) and is available from the front panel. The GBS2000 offers on-off controls for energy dispersion and chroma, three sync outputs, input connectors and controls for external audio and video modulation. The GBS2000 may be used as a signal source to facilitate alignment or troubleshooting of TVRO systems or components and circuits, including LNAs, LNCs, downcoverters, receivers, IF circuits, video systems and audio systems. Visit Newton at Booth 322 or call (415) 967-1473.

Birdview Satellite Communications

Birdview features a complete, matched satellite system that is engineered, designed and under warranty by one company. The package includes a one-piece, 9-foot spun-aluminum antenna, two 110-degree LNAs with downconversion, simple two-cable hookup and a simplified, unique, super-strong polar mount. The dual-conversion 24-channel receiver has a built-in modulator, synthesized tuning, variable audio tuning, LED digital readout and a built-in antenna switch. Birdview already has 425 established dealerships in 34 states with thousands of satisfied customers who demand and appreciate quality. See the satellite system at Booths 105, 106 and 107 or contact Birdview Satellite Communications, P.O. Box 963, Chanute, KS 66720.

Vector

Since its introduction at the Omaha SPACE show, the Vector Jr. remote has been a big hit with TVRO dealers. It is popular because of its ability to provide control of the mount, receiver and polarity from any place in the room with a simple hand-held control. A new option introduced at the Las Vegas show allows the viewer to control these functions from any room of the house. The Vector Jr. is easily adapted to more than 20 different receivers and can be purchased with actuators from 13 inches to 48 inches. Visit Vector at Booths 120, 121 and 122 or contact 519 East Broadway, Newport TN 37821.

Houston Satellite Systems

The Houston Tracker III satellite locater is now available with a parental lock-out feature. Using a four-digit code, the locater can lock a dish on or off a satellite, enabling parents to control children's viewing. The new feature can be added to existing Tracker IIIs by changing an EPROM chip. Visit Houston Satellite Systems at Booths 238 and 249 or contact (713) 784-8953.

Satellite Electronics International

Satellite Electronics International announces a new concept in the TVRO industry: to provide service on a local level to each dealer by way of a local representative. The company has a large and growing team of trained field representatives. Their goal is to provide your staff with sales techniques and advertising aids aimed at increasing sales. They are committed to excellence and will do everything in their power to provide you with fast, efficient service. For your nearest representative, call (800) 321-9335.

NASDA

NATIONAL ASSOCIATION OF SATELLITE DEALERS OF AMERICA

7107 SOUTH 400 WEST # 3 • MIDVALE • UTAH • 84047

WHAT IS NASDA?

The dealers' organization formed to unite the dealers together in the satellite industry, by working together for stability today, and in the future.

WHY WAS NASDA FORMED?

Statistics have shown, 7 out of 10 will fail in their effort to capture a share of the marketplace. They fail because of lack of experience, lack of product knowledge, financial support, the wrong location, inventory mismanagement, accounts receivable, unplanned expansion, competition, lack of sales and installation experience and dozens of other reasons.

NASDA MEMBERSHIP BENEFITS

- ★ SUPPORT
- ★ SERVICE
- ★ TRAINING
- ★ EDUCATION
- ★ PRODUCT EVALUATION
- ★ INSURANCE DISCOUNTS
- ★ MONTHLY NEWSLETTER
- ★ NATIONAL SEMINAR & WORKSHOPS
- ★ LOCAL & REGIONAL SEMINARS
- ★ GUEST SPEAKERS
- ★ INFORMATION SOURCE
- ★ SALES-AIDS
- ★ VIDEO TAPES
- ★ TRADE SHOWS
- ★ SUPPORT OF SPACE

MONTHLY NEWS COVERAGE OF

DBS	MANAGEMENT	TRENDS	PROGRAM SCHEDULES
PROGRAMMING	MARKETING	PRODUCT EVALUATIONS	INDUSTRY NEWS
NEW SATELLITES	REGULATIONS	SPACE	DEALER SUCCESS STORIES
PERSONALITY INTERVIEWS	NEW TECHNOLOGY	CONFERENCES	PITFALLS

ANNUAL SATELLITE DIRECTORY

The annual Satellite Directory: accurate, current listings of carriers, manufacturers, satellites, earth stations, technical services, excecutives, much more! The only complete industry directory.

WHO CAN JOIN

If you are an independent satellite dealer, distributor or manufacturer, representing more than two recognized satellite products, you may apply for membership. Membership is required in the local chapter as well as nationally.

Application Fee	$50.00
Membership Dues:	
Dealer	$150.00
Distributor	$300.00
Manufacturer	$600.00
International Dues	$175.00

For fastest service, CALL NOW
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for immediate membership entry by phone.

Please enter my one year membership in NASDA. I am a Satellite Dealer in _____

☐ Payment Enclosed* ☐ Bill Me ☐ Bill Company

☐ Master Charge ☐ Visa ☐ American Express

CARD NUMBER _____

NAME _____

TITLE _____

COMPANY NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____

Total Television

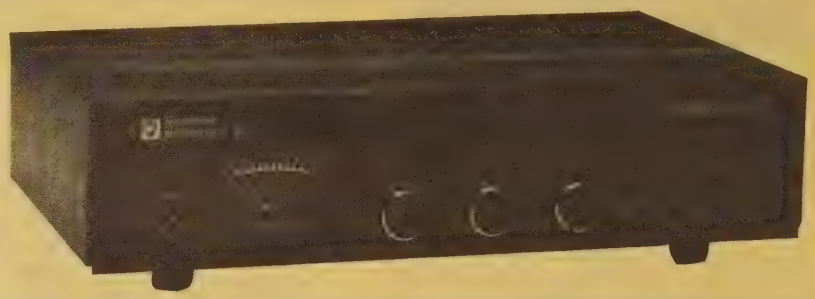
Total Television announces a Satellite TV antenna made by an entirely new method of production. The design of the 12-foot dish consists of a heavy-duty expanded-aluminum mesh reflective surface supported by 24 injection molded main support. The material from which the dish structure is molded is a very sophisticated plastic formulated to stand outside in all kinds of weather. The special injection molding process is such that no internal stresses are induced into the parts, eliminating warp and stress cracking of the final product even after years of use. Visit Total Television at Booths 126 and 127 or contact (503) 496-3583.

Vidare, Inc.

Vidare announces Voyager VII, a complete system for TVRO viewers who want big reception in a compact, attractive package. The Conway, Arkansas, company combines its industry-pioneering 8-foot fiberglass dish with a heavy-gauge, single-cylinder polar mount and an 85-degree LNA backfire feed system to form an eye-pleasing assembly for a cleaner, more attractive installation. The system's centerpiece is the new VID 8000 state-of-the-art receiver, which features auto fine-tune, wide/narrow audio bandwidth and a built-in 3-4 modulator. The package is available with optional programable positioner. For more information, visit Booth 99 or call (800) 643-1137.

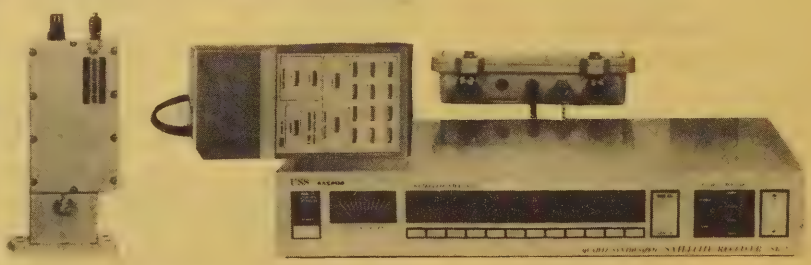
National Microtech

The Apollo Z-70 satellite receiver and weatherized downconverter is a feature-packed, low-cost, high-quality system manufactured exclusively for National Microtech. The Z-70 receiver features detent channel selection with automatic polarity switching, using the Apollo polarizer and fine-tune video control. Polarity format reversal, scan tune, tunable audio, signal strength meter, built-in antenna control and FCC certified modulator, plus a jack for remote-control option, are all standard features in a sleek wood-grain cabinet with a black anodized aluminum faceplate. This satellite TVRO system control is located in the full-featured receiver only from National Microtech. Visit National Microtech at Booths 71, 72, 73 and 74 or contact (601) 226-8432.



United Satellite Systems

USS points to an integrated and complete electronics package as a reason for superior reception quality. Designed by USS to incorporate the latest technology and engineering, the system includes the SR-1 LNC, the SR-1 receiver with quartz-synthesized instant tuning, soft-touch controls and an automatic audio tuner that allows scanning of all active audio subcarriers from 5 MHz to 8 MHz. It also has a second downconversion module that converts to 70 MHz, and the CRC-1 remote control that multiplexes a signal through the house wiring to permit receiver control from any room in the house by plugging into the nearest electrical outlet. The package comes with weatherproof housing and all wiring for easy installation. See the package at Booth 326 or contact Richard Anderson, United Satellite Systems, St. Hilaire, MN 56754, (218) 681-5616.



KLM

KLM's new Sky Eye VI Receiver makes satellite TV more convenient than ever before, with fast- and slow-scan tuning, automative polarity switching, push-button selectable and fully tunable audio and infrared and carrier remote control options. KLM's computerized Memory-Trak console easily programs up to 50 satellite positions and directs the motorized KLM X-11 or X-16 dish at the push of a button—no more guesswork or trips outside. The Memory-Trak also features a digital selection and readout panel, full east/west manual control and single-knob polarity control. Other conveniences include a memory safety lock and accessory AC outlet on the rear panel. Visit KLM at Booth 305, 306 and 307 or write KLM Electronics, P.O. Box 816, Morgan Hill, CA 95037, (408) 779-7363.

MTI Systems

MTI 2100 Features:

The Starchaser is the first computer controlled Satellite Antenna Positioning System which does not require a degree in advanced encryption techniques to operate. Very careful consideration has been given to making the Unit useful to every satellite television viewer, not just those who approach TVRO as a technical hobby.

- Independent East/West movement completely programmable.
- Unique Programmable Locking Feature can lock Antenna in any position, on or off satellite.
- All known Satellites listed on Keyboard and spares for future launches.
- LED read out (1" high).
- Pressure Sensitive Keyboard with Snap-Action Switching.
- Programmable Actuator Limits.
- Starchaser Computer Controlled Antenna/Positioning System includes actuator and 125 feet preassembled cable 12 or 36 volt available.
- Built-in Ni-cad battery for memory retention.
- Concealed Switches to dump memory.

FOR DISTRIBUTOR INFORMATION CALL

MTI Systems
MicroTenna, Inc.
2351 South 2300 West
Salt Lake City, Utah 84119
(801) 972-4819

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For more information contact these MTI Systems Master Distributors:

AV Electronics/Great Falls, MT., (800) 548-9950
Paradigm Manufacturing, Inc./Redding, CA., (800) 244-9300
Satellite Video Systems/Brownsburge, Quebec, Montreal, Canada, (514) 533-5470
Janeil Corporation/Reseda, CA., (213) 881-4155
Echosphere Corporation/Englewood, CO., (303) 935-1909
BR Satellite Communication/Bayside, NY., (212) 479-[illegible]
Walton Satellite TV/ Lebanon, PA., (717) 272-2064
Consumer Satellite Systems/Indianapolis, IN., (317) 299-0020
Arunta Satellite Communications/Phoenix, AZ. (602) 956-7042
Satellite Reception Systems/Athens, OH., (614) 594-2524
Warren Supply/Sioux Falls, SD., (605) 336-1830
Allsat/Shawnee Mission, KS., (913) 236-9692
Texsan/St. Angelo, TX., (915) 655-9090
Star-Com/Arlington, TX., (817) 261-8795
Also in Big Springs, TX., (800) 351-1426 (In Texas) (800) 592-1476

USS
THE PACKAGE THAT PAYS.

Pays in *quality.* Now superior television reception is available to home viewers with the United Satellite Systems' total electronics package. Pays in *reliability.* USS-designed with the latest technology and engineering in a totally integrated Sat-Pak.™ Pays in *convenience.*
The USS Sat-Pak™ hooks up quickly; tunes instantly, with easy-to-use "Soft Touch" controls. Choose USS for a system that pays for itself...in years of trouble-free viewing.

USS Satellite Receiver SR-1 includes:

- SR-1 LNC: 120° K.; 100° K.; 90° K.
- SR-1 Receiver: Quartz Synthesized Tuning; Automatic Polarity Switching; Integral Modulator; Automatic Audio Tuning; S.A.W. Filter Technology
- 2nd Conversion Module: Polarity Switching Power Supply; Antenna Alignment Test Point; Waterproof Housing
- CRC-1 Remote Control: Full Function; Power Line Carrier; Plugs Into Any Wall Outlet
- All Cables & Connectors Supplied

For more information on the USS payoff package, write, or call 218-681-5616

USS
UNITED SATELLITE SYSTEMS

St. Hilaire, MN 56754

Stop in and see us at CAN-AM '83, Minneapolis, June 24, 25, 26. Booth Number 326.

Minneapolis Survival Guide

Welcome to the Twin Cities

The Twin Cities, also known as the "Gateway to the Land of 10,000 Lakes," are famed for their many lakes and excellent park system. Twenty-two lakes and lakelets riddle the Minneapolis city limits. They boast fine beaches and opportunities for swimming and other water sports.

The streets of Minneapolis run parallel and at right angles to the meandering Mississippi. The heart of the city's shopping, banking and cultural centers lies in the area downtown surrounding the Nicollet Mall. This pedestrian-only mall features seven blocks of stores and sidewalk stops, along with the library, Federal Reserve Building, towering IDS building and the city center. A stroll down the sidewalks flanked by trees, flowers, benches and fountains is recommended.

Two major historic areas have been renovated and adapted from warehouses to shops and restaurants. Their old-time ambience, high quality and unusual selection make Butler Square and St. Anthony Main favorites.

Points of Interest

Betty Crocker Kitchens 9200 Wayzata Blvd. Visit Betty Crocker's seven kitchens and learn the story of General Mills with a multi-image presentation and tour. All tours are preceded by complimentary coffee and cookies or a sweet roll. Open 9 a.m.-4 p.m., admission is free, but call 540-2526 to make reservations.

Gibb's Farm Museum Larpenteur Ave. West, St. Paul. Learn about farm life of 100 years ago with an hour and a half tour around the farmhouse and kitchen, the schoolhouse, barns, animals and fields. Admission $1.75. Open 10 a.m.-5 p.m. Tuesday through Friday, noon-4 p.m. Sunday. Call 646-8629.

Historic Fort Snelling Reached by Fort Snelling exits on highways 5 and 55. On a commanding bluff above the Mississippi and Minnesota rivers, Fort Snelling has been restored to its original appearance. Visitors can see what life was like 150 years ago at Fort Snelling and are encouraged to take part in everyday tasts from stitching quilts to shouldering muskets. Open daily from 10 a.m.-5 p.m. Admission is $1.50. Call 726-9430.

Minnesota Zoo Apple Valley. Spend a wild day with tigers, whales, camels, beavers, dolphins, leopards, monkeys and bison at the world-famous Minneapolis Zoo. Open 9:30 a.m. to 6 p.m. daily. Admission $3. Call 432-9000.

Minneapolis Institute of Arts 2400 3rd Ave. South. Until the end of July, the institute will present a special exhibit from New York's Metropolitan Museum of Art. "The Art of Chivalry," a display of arms and armor from the days of the knights, can be seen from 10 a.m. to 9 p.m. Admission $3. Call 870-3140.

Mississippi Riverboat Tour Nagasaki Road, St. Paul. Follow the route of the early explorers along the Mississippi. This narrated tour boat glides past the expansive Minneapolis skyline and undisturbed banks. The one hour, 45 minute tour is narrated with historic highlights. Cost is $5. Call 227-1100 for departure schedule.

State Capitol Building Aurora and Park Ave., St Paul. Observe government in action and enjoy the impressive art and architecture of Minnesota's State Capitol in St. Paul. This handsome capitol building is renowned for its unsupported marble dome. Guided tours are offered on the hour, Monday through Friday, 9 a.m.-4 p.m.; Saturday 10-3; and Sunday 1-3. Call 296-2881.

Walker Art Center 725 Vineland Place. The Walker Art Center exhibits contemporary paintings, sculpture, prints and photos. From punk rock to chamber music, from fine dance performances to children's films—Walker's Art Center presents all the arts. Conveniently located next to the Guthrie Theatre. Free public tours at 2 p.m. on weekends. Open Tuesday through Saturday, 10 a.m. to 5 p.m. Call 375-7600.

Theater

Carlton Celebrity Room Dinner theater. 8350 24th Ave. South. The Carlton Room brings Las Vegas-style entertainment to Minneapolis. Enjoy a fine dinner and cocktails while listening to Gladys Knight and the Pips, June 24 and 25. Show begins at 8 p.m. Tickets cost $26.95 and $28.95. Call 854-9300 for further information.

Chanhassen Dinner Theatre Chanhassen, Minnesota. The largest entertainment complex of its kind in the nation, Chanhassen's combines the best of stage with delicious dining. Sure to offer variety, Chanhassen's boasts four professional dinner theaters in one building. The cost of the shows (including dinner) ranges from $17.50 to $26.50. Open Tuesday through Sunday. Call 934-1525 for listings and reservations.

The Cricket Theatre 528 Hennepin Ave. One of the area's most intimate professional theaters presents the Out and About Theatre Company's production of *Boy meets Boy*. Call 333-2401 for further information.

Dudley Riggs' Theatre 1430 Washington Ave. South. Located in the new Minneapolis Theater District, this original theater offers music, satire, improvisation and stand-up comedy acts. Showing on Friday and Saturday nights is *I Compute, Therefore IBM,* a classic comedy on the computer rage. All seats are $7. Shows are at 8 p.m. and 10:30 p.m. Call 332-6620 for further information.

Guthrie Theatre 725 Vineland Place. This world-famous repertory theater presents a wide variety of acts, ranging from Shakespearean classics to contemporary comedy. The musical *Three Penny Opera* will be presented June 24-26. Tickets begin at $9.95. Call 377-2224 for information and ticket reservations.

Minnesota Dance Theatre 528 Hennepin Ave. *Graduation Ball,* a one-act ballet by David Lichine, will be presented on June 25 at 4:30 p.m. and June 26 at 2 p.m. Call 339-9150 for further information.

Restaurants

There are scores of restaurants in the Twin Cities area. Here are a few to begin with. (AX = American Express; CB = Carte Blanche; DC = Diner's Club; MC = Master Charge; V = Visa).

Anthony's Wharf Seafood. 201 S.E. Main. Enjoy fine dining with a beautiful view of the Minneapolis skyline. An-

In any application, insist on an Odom Antenna... It's
SOME DISH
Let's face it. We are in a high technology industry. And nothing spoils high technology like low quality.
Odom Antennas has manufactured quality fiberglass antennas for years and has established themselves as a leader in the industry.
Odom antennas feature the unique zinc flame spray reflective surface and each individual manufacturing process is inspected for quality control.
Odom offers a wide variety of residential and commercial antennas, ranging from the 6½-foot dish all the way up to the 20-footer.
(Dealer and distributor inquiries invited.)
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(501) 882-6485 / 1-800-643-2950
See At Booth 131 & 132

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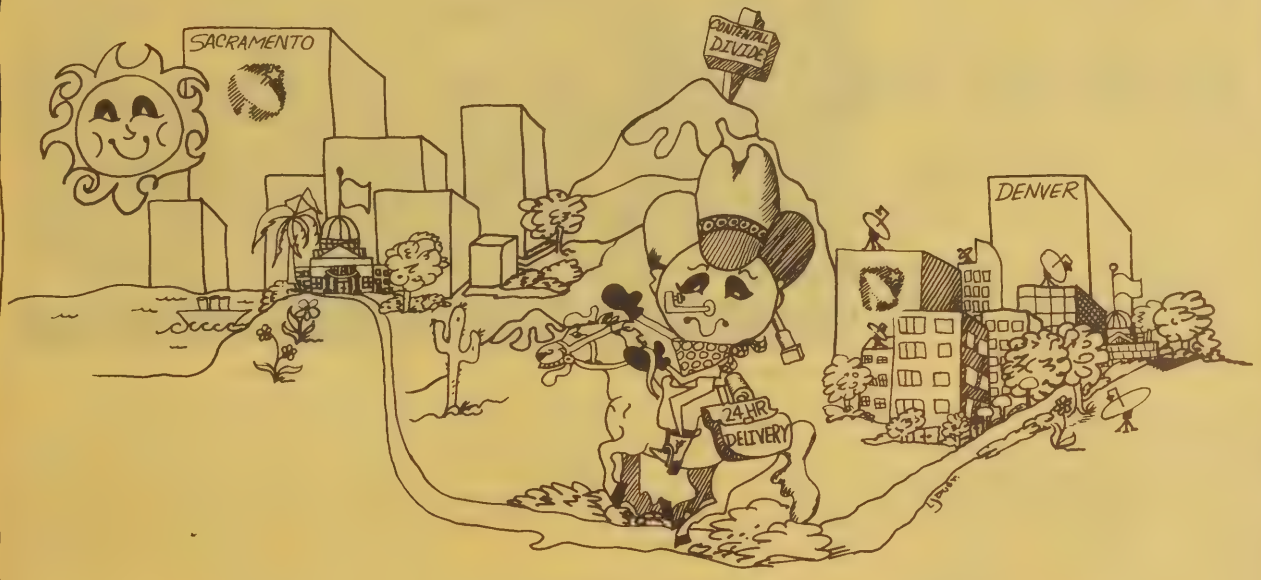

Stocking Master Distributor For:

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Arunta	DH Antennas	KLM	Satellite Ground Components
Automation Techniques	Danex	Luly	Sat-Tec
Avcom	DX Receivers	Luxor	Transifier
Blonder-Tonque	Dexcel	MTI	UHF Associates
California Amplifier	Drake	Norsat Tweaker	Vector Systems
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TO ORDER CALL: 800-338-5477 (WESTERN ZONE)
800-338-5478 (IN-STATE CALIF.)

ECHOSPHERE CORP. T.M.
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Englewood, CO 80110
(303) 935-1909

TO ORDER CALL: 800-521-9282 (NATIONAL)

thony's Wharf presents live jazz outside on the spacious deck on Friday and Saturday nights. Scallops, swordfish and a special wine and cheese bar are among the well-known specialties here. V, MC, AX. Reservations accepted. Call 378-7058.

Bennigan's Tavern Steaks and seafood. 1800 W. 80 Street. Enjoy a unique variety of finger foods, including nachos, potato skins and fried zucchini in Bennigan's relaxed "fern bar." Bennigan's also offers complete dinners, from quiche to steaks. AX, MC, V. Call 881-0013.

Black Forest Inn German. Nicollet at 26th St. The Twin Cities' foremost German restaurant offers a wide variety of continental specialties, including sauerbraten, shish-ka-bob, paprika and weiner schnitzel, brautwurst and Polish sausage. AX, V, MC, DC. Call 872-0812.

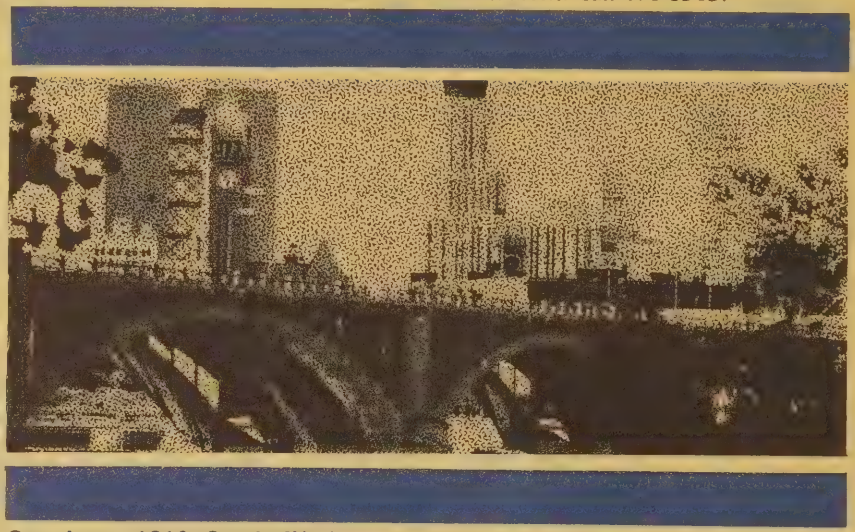
Chi-Chi's Mexican. 494th and Nicollet. Home of the chimichanga—a deep-fried flour tortilla with a spicy meat filling—and the fiesta margarita, Chi-Chi's offers an extensive array of subtly spiced, Sonoran-style dishes. All major credit cards. Call 866-3433.

D.B. Kaplan's Sandwiches. Butler Square Building. Nowhere on earth will you find a sandwich more mountainous than at D.B. Kaplan's Delicatessen. It serves over 150 sandwiches, with names such as Ike & Tina Tuna and The Minneapolis Stingwich. D.B.'s is located in the atrium of Butler Square. AX, MC, V. Call 332-0903.

Eddie Webster's 1501 East 78 St. Eddie Webster's promises a full evening of entertainment. For starters, try the prime rib or delve into the champagne dinner for two, which includes a large steak and all the fixings. Afterward, move to the peanut bar and munch on free popcorn and peanuts with your beer or cocktail. If you'd rather be dancing, there's live entertainment in the lounge. All major credit cards. Reservations recommended. Call 854-4056.

Forepaughs 276 South Exchange, St. Paul. Dining is grand in this restored Victorian mansion. Choose from nine separate, plushy dining rooms. Forepaughs' menu emphasizes seafood, but is complemented by veal, beef and poultry dishes. MC, V. Reservations necessary. Call 224-5606.

Fuji-ya Japanese. 420 South 1st St. Fuji-ya offers fine Japanese cusine in two separate restaurants. The upper floor accommodates a more traditional setting, where shoes are removed at the door and seating is on mats on the floor. The foods include tempura, sukiyaki and a full sushi bar. Downstairs, the chefs will prepare your food right on your grill-top table. Traditional western seating is also available. All major credit cards. Reservations suggested. Call 339-2226.



Grandmas 1810 South Washington Ave. Slip back in time to a bygone era. Grandmas offers casual dining in an elegant atmosphere. The menu is varied—from Italian specialities to prime rib—and the portions are generous. AX, V, MC. Reservations suggested. Call 340-0516.

Lido Italian Restaurante 1611 Larpenteur Avenue, St. Paul. Lido is one of the small, elite group of restaurants based on authentic, homestyle recipes. A lifetime spent developing and perfecting these old family recipes adds up to expertly prepared, quality food. For a real treat, try the veal parmesan, fetticine Alfredo or baked canneloni. This family-owned restaurant is sure to please the palate. MC, V. Reservations accepted. Call 646-2656.

Lincoln Deli 4401 West 80 St. This branch of the Lincoln Deli (one of three) is recommended for a tasty lunch. Specializing in some ethnic foods, including blintzes, beef borscht and other kosher foods, Lincoln's also offers a wonderful take-out bakery and deli. Also open for breakfast and dinner. No credit cards accepted. Call 831-0780.

Lord Fletcher's 3746 Sunset Drive. Dine in this old English country manor overlooking beautiful Lake Minnetonka . . . or outside on one of its spacious decks. Lord Fletcher's prices are steep, but the food is impeccable and there's music to enjoy outdoors on weekends. Enjoy ribs, salads and sandwiches on the Lake Level Restaurant or join in a game of volleyball on one of the courts. Docking facilities are available for 60 boats. All major credit cards. Reservations a must for Lord Fletcher's, but not necessary for the Lake Level Restaurant. Call 471-8513.

Nankin's Chinese. 2 South 7th St. A bustling, popular place, Nankin's has been a Twin Cities' tradition since 1919. Its chop suey and chow mein are considered by many to be the "best in the world." Nankin's offers Cantonese, American and Szechuan foods to eat in or take out. AX, V. Reservations accepted. Call 333-3303.

New French Cafe French. 128 North 4th St. Fresh seafood, freshly baked bread and croissants, wonderful salads and omelets—this cafe makes everything from scratch, daily. The food is not traditional french, but offers a variety of regional-style French dishes. Classy dining in a casual atmosphere, the New French Cafe is open for breakfast, lunch and dinner. All major credit cards. Reservations accepted. Call 338-3790.

Orion Room Seafood. 50th Floor of the IDS Tower. This top-notch restaurant is sure to delight you with a breathtaking view of the Minneapolis Skyline. Perched on the 50th floor of the IDS tower, this many-windowed setting provides a perfect atmosphere for evening cocktails. Specializing in American haute seafood and fine wines, prices are steep. All major credit cards. Reservations necessary. Call 372-3772.

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Twin Cities' oldest restaurant on the river on the oldest street in town promises a casual, comfortable atmosphere complete with checkered tablecloths. The menu is varied and includes burgers, lasagne, chicken, shrimp and steak. All major credit cards. Reservations at lunch strongly suggested. Call 379-3200.

Radisson South Sunday Brunch. 7800 Normandale Blvd. The Sunday brunch at Radisson South Hotel is nothing less than overwhelming. Next to the pool in the Garden Court, you will find tables heaped high with hot roast beef, lamb, veal, smoked fish, quiche and other hot and cold platters. Wander over to the omelet/waffle station, where you may watch the chef prepare the omelet of your choice. The dessert display, garnished with clusters of fresh and silk flowers, includes fresh-baked croissants, cheesecakes, pies, souffles, mousse, fruit muffins and homemade Danish. For $10.95, this is an event that should not be missed. All major credit cards accepted. Call 835-7800.

Rudolph's Barbeque 1933 Lyndale Avenue South. Pictures of old-time movie stars sparkle from the walls of this casual restaurant. Enjoy barbequed ribs, chicken or steak in an entertaining atmosphere. No credit cards. Call 871-8969.

Rusty Scupper Seafood and steaks. 4301 West 80 St. Although seafood is Rusty Scupper's specialty, it also offers a wonderful prime rib. The restaurant is open and casual and there's entertainment in the lounge every night from Wednesday to Saturday. Reservations accepted. V, MC, AX, DC. Call 831-5415.

Stone Wings 8301 Normandale Blvd. Although the tab will usually run high here, Stone Wings is offering some well-priced June specials, including lobster tail on Friday evenings for $11.95, or a hefty steak-and-lobster plate for two persons for $24.95 on Saturday nights. There's entertainment in the lounge every night for those who like to dance. All major credit cards. Reservations recommended. Call 831-4811.

T.G.I. Fridays 5875 Wazata Blvd. Located in St. Louis Park, T.G.I. Fridays bills itself as a New York-style restaurant/bar. The menu is extensive: 203 items to be exact, including 22 appetizers. If you're looking for something special—from steak to pasta to quiche—you'll find it here. V, MC, DC, AX. Call 544-0675.

Victoria Station Steaks and seafood. 4701 West 80 St. Victoria Station features three fresh fish catches of the day and a variety of steaks and seafood. The restaurant's authentic furnishings are based on the British railway system. The food is top-notch and prices are reasonable. All major credit cards. Reservations recommended. Call 831-1050.

Winfield Potters 210 S.E. 2nd St. *Twin Cities' Magazine* rated the salad bar here as one of the best in the area. All the food is made from scratch, including the fetticine, and the fish is fresh from Boston. For an added treat, enjoy your meal in the outdoor gazebo garden or have your food cooked over the mesquite charcoal grill. V, MC, AX. Reservations accepted. Call 378-2660.

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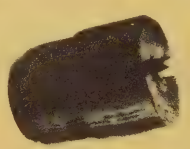

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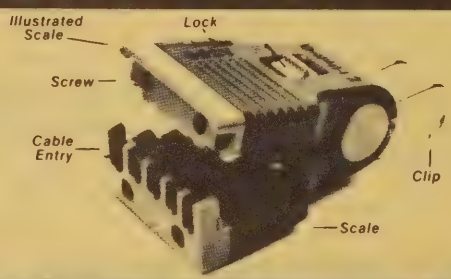

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Cabooze on the West Bank 917 Cedar St. The Twin Cities' showcase music nightclub offers drink specials every night of the week. This weekend the "Flamin' Oh's" will be rocking and rolling in this enormous bar. Call 338-6425.

Downtown Danceteria 701 1st Ave. North. The Downtown Danceteria prides itself on being the most progressive nightclub in the area. Offering live, recorded and video entertainment in a punky setting, try the Danceteria for a new beat. Call 332-1775.

Emporium of Jazz 1351 Sibley Memorial Highway. For New Orleans-style jazz, the Emporium should not be missed. Hot jazz acts play year-round; call 452-1868 for the current lineup.

Sergeant Preston's 221 Cedar Ave. South. This San Francisco-style saloon, with its stained glass windows and tiffany, offers both a bar and good eating. Though considered more of a night spot than a restaurant, Sergeant Preston's offers a "build-your-own-sandwich-and-soups-bar" with a wonderful array of items to build over 200 types of sandwiches. Call 338-6146.

Sweeny's 96 North Dale St., St. Paul. Sweeny's offers a champagne bar for all you bubbly fans. Though live entertainment is not usually offered, call to see what's happening at 221-9157.

Sports/Recreation

Twins Baseball The Twins will be in Chicago this weekend.

Bicycle Rentals
The Bike Shop. 215 S.E. Oak. Call 331-3442. $5 per day.

Now Sports, Inc. 1715 W. Lake Call 827-2838. $15 per day.

Roller Skate Rentals
Now Sports, Inc. 1715 W. Lake. Call 827-2838. $2 per hour.

Pierce Skate & Ski, Inc. 208 W. 98 St. Call 884-1990. $7.50 per day.

Canoe Rentals At lakes Calhoun and Nokomis. $3.50 per hour.

Fishing Boat Rentals At Lake Calhoun. $3.50 per hour. Call 348-5406 for information on either canoes or boats.

Transportation

The city's MTC bus service runs the entire length of Nicollet Mall, past most of the downtown area's major hotels and motels and near the Minneapolis auditorium and convention center. Taxis are available, but costly. For city bus route information, call 827-7733 or stop by the visitor's center in the IDS crystal court of the IDS tower.

Various limosine services are available to and from the Minneapolis-St. Paul Airport. Call the airport at 726-1717 for specific information.

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Tracking Down the Right TVRO System

(Continued from page 4)

receiver, LNA and antenna for any location. Remember that the common denominator for any earth station is determined by the EIRP level of the weakest transponder to be received. Since there are so many variables that can affect the performance of an earth station, we have

For dealers who own a VIC-20 or Commodore 64, a computer program is also included that provides greater versatility in component selection . . .

assumed certain average values to minimize the complexity of the chart. For dealers who own a Vic-20 or Commodore 64, a computer program is also included that provides greater versatility in component selection (See Table 2 on page 32).

Each of the various combinations of LNA, receiver and dish size listed on the chart will provide a margin of at least 1.5 dBs above threshold. When the receiver is operating below its threshold rating, the picture will contain impulse noise or

Fig. 4. SPACENET I Transmitting Antenna (4 GHz) 119°W

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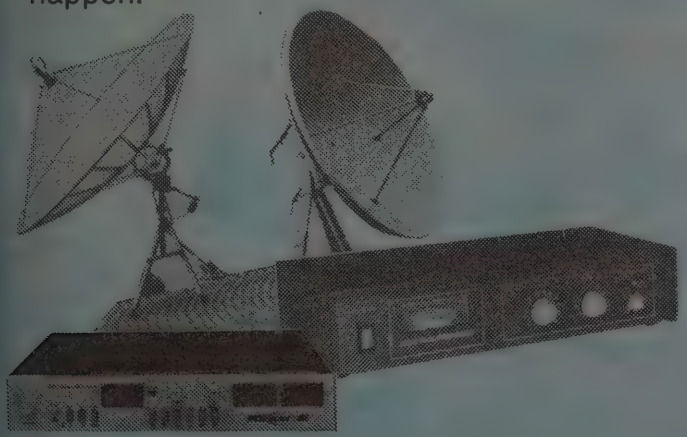

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TABLE 1. EIRP to Dish Size Conversion Chart*

(4 GHz Satellite EIRP contours)

	8 dB CNR Threshold Receiver				7 dB CNR Threshold Receiver			
EIRP (in dBWs)	120 K LNAs	100 K LNAs	80 K LNAs		120 K LNAs	100 K LNAs	80 K LNAs	
40	6 ft.	5 ft.	5 ft.		5 ft.	5 ft.	4 ft.	
39	6 ft.	6 ft.	5 ft.		6 ft.	6 ft.	5 ft.	
38	7 ft.	7 ft.	6 ft.		6 ft.	6 ft.	5 ft.	
37	8 ft.	7 ft.	7 ft.		7 ft.	7 ft.	6 ft.	
36	9 ft.	8 ft.	8 ft.		8 ft.	7 ft.	7 ft.	
35	10 ft.	9 ft.	9 ft.		9 ft.	8 ft.	8 ft.	
34	11 ft.	10 ft.	9 ft.		10 ft.	9 ft.	8 ft.	
33	12 ft.	11 ft.	11 ft.		11 ft.	10 ft.	9 ft.	
32	14 ft.	13 ft.	12 ft.		12 ft.	11 ft.	11 ft.	
31	15 ft.	14 ft.	13 ft.		14 ft.	13 ft.	12 ft.	
30	17 ft.	16 ft.	15 ft.		15 ft.	14 ft.	13 ft.	
29	20 ft.	18 ft.	16 ft.		17 ft.	16 ft.	15 ft.	
28	22 ft.	20 ft.	18 ft.		20 ft.	18 ft.	16 ft.	
27	24 ft.	22 ft.	21 ft.		22 ft.	20 ft.	18 ft.	
26	27 ft.	25 ft.	24 ft.		24 ft.	22 ft.	20 ft.	

*At 55% dish efficiency, 30 MHz receiver bandwidth, and average free space loss values. Reception of those satellites which require a dish elevation setting below 20 degrees will require slightly larger antenna sizes than those listed above.

"sparklies," which degrade the incoming video signal. A healthy margin above threshold will allow your system to provide noise-free video and offer a "buffer" in the event that the TWTAs on

Dishes that improve their efficiency either by using tighter curvature tolerances or cassegrain feed techniques are capable of achieving from 65 to 70 percent efficiency.

board any of the various satellites become weaker over the course of their lifetimes.

The chart provided here assumes that the dish selected has an efficiency of at least 55 percent. Dishes that improve their efficiency either by using tighter curvature tolerances or cassegrain feed techniques are capable of achieving from 65 to 70 percent efficiency. This would produce an additional 1 dB of gain for a given antenna aperture. In many cases, this would allow the use of

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the next size smaller antenna with equivalent performance. The computer program provided allows exploration of this, as well as several other variables that play a part in determining the overall performance of any system.

It seems that EIRP errors in computer-predicted contours occur most often out on the edges of the footprint pattern.

Those dealers in South America and the southern Caribbean are cautioned that their areas are likely to experience EIRP levels that are at variance with those given in footprints accompanying this article. It seems that EIRP errors in computer-predicted contours occur most often out on the edges of the footprint pattern. Reception in North America has pretty much borne out the accuracy of the CONUS contours given by the satellite operators.

—Mark Long

TABLE 2. Computer Program for the VIC-20 or Commodore 64

```
1 PRINT "□"
2 PRINT"******SATELLITE******"
3 PRINT"****EARTH STATION****"
4 PRINT"*******ENGINEER******"
5 PRINT
6 PRINT"***@COPYRIGHT 1983***"
7 PRINT"******MARK LONG******"
10 PRINT
15 PRINT
20 INPUT"DISH SIZE (IN FEET)";A
25 PRINT
30 INPUT"DISH EFFICIENCY (%)";B
35 PRINT
40 INPUT"FREQUENCY (IN GHZ)";C
45 PRINT
50 INPUT"BANDWIDTH (IN MHZ)";D
55 PRINT
60 INPUT" THRESHOLD (IN DB)";E
61 PRINT
63 INPUT "SITE LATITUDE";T
65 INPUT "SITE LONGITUDE";V
66 INPUT "SATELLITE LONGITUDE";X
67 Z=π/180
68 F=26485*SQR(1-(.295*COS(Z*T)*COS(Z*(V-X))))
69 F=F*1.606
70 INPUT"PATH LENGTH (IN KM)";F
72 P=30/C
73 Q=.000001*P
74 R=(4*π*F/Q)↑2
75 S=10*log(R)/LOG(10)
76 INPUT"DISH ELEVATION";0
77 IFO=<31 AND O=>20 THEN U=25
78 IFO=<21 AND O=>10 THEN U=30
79 IFO=<11 AND O=> 4 THEN U=40
80 IFO=<5 THEN U=50
81 IFO=>30 THEN U=20
85 INPUT"LNA N. TEMP";G
87 PRINT
90 A=A/3.2808
95 PRINT
100 INPUT"SATELLITE EIRP";H
105 PRINT
110 I=10*(LOG(B*(A*A)*(C*C)))/LOG(10)
120 J=(1.38*(10↑-23)*(G+U)*(D*(10↑6)))
130 K=10*LOG(J)
135 M=K/LOG(10)
140 L=H-S-M+I-E
145 PRINT
150 PRINT"EARTH STATION
 MARGIN:";PRINTL"DB"
155 PRINT
160 PRINT"DISH SIZE AND GAIN:":
 PRINTA"METERS":PRINTI"DBI"
165 PRINT
170 PRINT"RECEIVER BANDWIDTH:":
 PRINTD"MHZ"
175 PRINT
180 PRINT"RECEIVER THRESHOLD:":
 PRINTE"DB"
185 PRINT
190 PRINT"LNA NOISE TEMP:":
 PRINTG"DEGREES KELVIN"
195 PRINT
200 PRINT"FREE SPACE LOSS:":
 PRINTS"DB"
205 PRINT
210 PRINT"SATELLITE EIRP:":
 PRINTS"DBW"
215 PRINT
220 INPUT"ANOTHER";A$
225 IFA$="Y" THEN GOTO 1
230 IFA$="N" THEN GOTO240
240 END
```

Inputs for dish elevation and path length can be obtained from satellite locator computer programs that are available from several companies. Or average values may be used: 25 degrees and 40000 KM.

(NOTE: All zeros have a line drawn through them)

SEE: (BOOTH 229 · CAN-AM '83)

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SIM•PLIC•I•TY (sim-plis'e-ti) N. a being simple; freedom from complexity, difficulty, etc.

At Houston Satellite Systems, we build the Tracker I tracking system solely for simplicity and ease of use. Our features ensure that what you get is a state-of-the-art product, not a worthless pile of blown fuses and scrap metal.

Our three digit display with liquid crystal readout shows you a programmable satellite position number, easily recallable at either a fast or slow speed, at the touch of a button. Tracker I is equipped with a Polarotor rotatable drive system that automatically allows for "SKEW" compensation across the arc. Each Tracker I comes complete with a 36 volt 18″ or 48″ actuator. Additionally, this unit features programmable over-travel protection. Best of all, it is a Tracker system by Houston Satellite Systems, makers of incomparable satellite tracking systems.

HOUSTON SATELLITE SYSTEMS, INC.
8000 Harwin, Suite 397
Houston, Texas 77036
713/784-8953

TRACKER I shown with optional solid wood sides.

TRACKER I is a trademark of Houston Satellite Systems, Inc.

Available from the following distributors: Capitol Electronics, Oklahoma City, OK (405) 721-7677 • Delstar Systems, Houston, TX (713) 776-0542 • Delta Satellite, Grafton, WI (414) 375-1000 • Echosphere, Englewood, CO 1-800-521-9282 • Echosphere, Sacramento, CA 1-800-338-5477, 1-800-338-5478 in CA • High Frontier Dist, Phoenix, AZ 1-800-382-0395 • High Frontier NW Dist, Seattle, WA (206) 575-0660 • I.V.C., N. Little Rock, AR (501) 771-2800 • Klan, S.A., Mexico (78-62-03) • Lindsay America, Williamsport, PA 1-800-233-2303 • Lindsay, Ontario, Canada (705) 324-2196 • National Satellite, Latham, NY 1-800-833-4485 • Odom Antennas, Beebe, AR 1-800-643-2950 • Pen's Electric, Baton Rouge, LA (504) 664-4106 • Quarles Satellite, Greenwood, SC 1-800-845-6952 • Sat-Com, Kellyville, OK (918) 247-6048 • Satellite Relay, Cardiff, CA (619) 436-1555 • Satellite Video Dist, McAllen, TX (512) 682-4501 • Satellite Video Systems, Kansas City, MO (816) 333-0315 • Star-Com, Big Spring, TX 1-800-351-1426, 1-800-592-1476 in TX • Tele-Sat, Miami, FL 1-800-327-7272 • Vicom-Norad, Orange, CA (714) 997-0630 • West Inc, Mt. Vernon, WA (206) 428-2810 • Wholesale Elect. Supply Sat, Austin, TX (512) 478-9568 • Wright Technology, Hattiesburg, MS (601) 545-2545

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From a modest start with its first issue in June, 1982, *Satellite ORBIT* magazine now reaches more than 150,000 readers every month—the most widely read satellite television magazine in the world! And now there is a way for you—*the dealer*—to share in this success so you can create a new profit center and increase your product sales!

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Program L. As a dealer, you know how valuable a complete, easy-to-read program guide can be for interesting potential customers in your products. The continuously updated *Satellite ORBIT Merchant Edition Program Log* lists complete programing for all North American domestic video satellites, plus notes on planned services, a handy page for referencing satellite positions at a glance, a complete alphabetical listing of movies to be shown during the month and weekly updates on sports and entertainment specials. In fact, it is the very same guide that forms the "backbone" of *Satellite ORBIT* magazine—but it has *no* advertising to compete with your products.

Cover price: $4
Your cost: $1.75 each
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If you would like more information about the *Satellite ORBIT* Dealer Program, please call us toll free at 1-(800)-792-5541 from 7 a.m. to 6 p.m. (MT) or write to us at the address below:

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PLEASE ENROLL ME IN:

Program L—THE SATELLITE ORBIT MERCHANT EDITION PROGRAM LOG
Please send me_____program guides per month @ $1.75 each. (Price is $2.50 each outside the contiguous U.S. Freight is included. Available in multiples of 10 only.—Cover price: $4.00.)

Program M—THE COMPLETE SATELLITE ORBIT MAGAZINE PROGRAM
Please send me_____magazines per month @ $2.50 each. (Freight is extra. Please phone us for exact charges to your area. Magazines are available in multiples of 10 only.—Cover price: $5.00.)

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DP63

Dealer Program

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